CALIFORNIA STATE DEPARTMENT OF PUBLIC HEALTH
WALTER M. DICKIE, M.D., Director

Weekly Bulletin

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Why Epidemics

(Continued from last issue)

This supposition and no other as yet conceived offers an explanation for the many intriguing observations the investigator continually meets in the discovery of accidental, natural and purely artificial or experimental hosts. Diseases, as for example, anthrax, glanders, hoof and mouth disease, Bang's disease of cattle and hogs, Malta fever of goats, rabies, parrot fever and others maintain themselves as epidemic scourges in continuous transmission chains among certain animals. Occasionally, human beings become infected. These aberrations, as a rule, end blindly and a transfer of the parasites from the infected human being to his contacts occurs only under exceptional and rare circumstances. Searching inquiries in many countries and on thousands of patients have failed to disclose secondary infections with the undulant fever organisms. Human to human infections due to the parrot fever virus were suspected as early as 1892, but conclusive proof was furnished only during the recent investigations in California and Pittsburgh. An elderly lady who had been exposed to a sick parrot in a department store was nursed by her sister and, although she finally recovered, she transferred through her sputum the disease agent and fatally infected her relative who had never been exposed to the sick bird. For the first time the virus was demonstrated in the contact case. These and similar observations indicate a preexisting susceptibility as an inherent human characteristic. However, an adaptation of these parasites to man through his evolutionary ascendency has never taken place. What disclosed itself in the spontaneous diseases has been broadened by experiments. Our factual knowledge has been greatly enlarged by deliberate transmissions of diverse infectious processes to heterologous, artificial hosts remotely related zoologically and which are never infected under natural conditions. Indeed, combinations previously considered impossible have been successfully created without subjecting the microorganisms to a prolonged period of adaptation. According to Kolle and Schlossberger, white mice may be readily infected with the Spirochaeta of human syphilis; the parasite remains latent in the brains for over one year. Equally conclusive and from a practical standpoint, very important are the transmissions to white mice of bird infections such as fowl plague (Doerr et al) and parrot fever (Krumwiede), the yellow fever and sleeping-sickness virus and other specific diseases of man. The scientific horizon concerning typhus and Rocky Mountain spotted fever has been widened by the discovery that guinea pigs, rabbits and rats possess variable dispositions for the rickettsia organisms. In the field of helminthic infections, the enforced localization of the larvae of trichinae in the muscle of birds (Doerr and Schmidt) has not received the recognition it deserves. To be sure, many of the scattered observations have not been analyzed in the light

of the above discussion but certain consistencies project from the mass of bewildering and contradictory facts. For example, the exceedingly broad range of dispositions among the rodents suggest a common historical origin. Since many of the parasites involved in these aberrant transmissions are adapted to certain specific tissues, even to cells (a state known as organotropism) is has been suspected that the conditions of existence are equivalent in the various animal hosts. This explanation is certainly not tenable in view of the enormous number of capricious pairings of the past and the zoological remoteness which separates the various hosts which have been found susceptible.

The parasitic diseases of man and animals are obviously a part of a broad evolutionary development. Many of man's ailments may have antedated his arrival, while others may have accompanied him through the generations of his ascendency. The majority probably evolved during the historical growth of the human races primarily as adaptations due to predatory or free living organisms and secondarily by accepting parasites of other animal hosts through so-called life or host cycles. Neither the available facts nor even speculation offers enough leads for the selection from the three possibilities of the one most likely to be involved in the origin of a present day infectious disease. A primary development within man is most likely to have taken place in a disease which is not transferable to any known species of animal. It is important, however, that the probability must be kept in mind that the parasite may have been transmissible to some of the extinct species or that the monospecific adaptation for man was secondarily acquired through retrogressive loss of original properties.

The phytopathologist has experimentally observed nematodes adapt themselves through several generations to such a degree that they are unable to infect the original host plant. Thus intimately interwoven with the integration of the disposition of the hosts is another genetic factor, *the biologic plasticity of the parasite.* The lowly organized unicellular organisms, bacteria, Spirochaetes and ultramicroscopic disease agents, exhibit this property to a remarkable degree. Even in short lived laboratory experiments, they may develop interesting morphologic and biologic variants of one sort or another.

The transformation of the small-pox or variola agent by passage through the skin of the calf into the harmless cowpox or vaccinia virus is well known since this mutation forms the theoretical basis for the Jennerian antismall-pox vaccination. The ability to invade the tissues may be enhanced at will by rapid passage from animal to animal, or a pathogenic microbe may be robbed of its infectiousness by continuous cultivation on unsuitable culture media. That a disease producing microbe degrade to a saprophyte may, under certain decidedly limited and meagerly understood conditions, have its infectiousness restored merely sketches the far-reaching boundary lines within which the variability of parasites may manifest itself. Finally, the following type of variation deserves attention: If a disease agent, which is non-infectious for host A, is passed through an artificial host B, it may acquire the power to invade host A. For example, the filtered nasal washings from a human case of influenza are non-infectious for the mouse. However, they induce a fatal disease in ferrets. The juice extracted from the lung of the diseased carnivore now infects mice. It is well to remember that these are merely laboratory experiments which create no new species, but modify certain properties of the already existing parasites. They permit, however, an insight into the unlimited kaleidoscopic store of variations which have exerted their powerful forces from time immemorial. One may conclude, therefore, that the forces making for disease have always existed and are everlasting.

The written history of the parasitic diseases of man embraces an infinitesimally small epoch of time. From the works of his hands, namely, writings, paintings, etc., and the bodily remains of man himself have been woven the accounts of deeds and suffering of the human races through many thousands of years. The accuracy of the account depends on the nature of evidence contained in the records and the correctness of the interpretations. This evidence becomes more difficult to unravel the older it is. It will, therefore, be readily understood that in respect of the various aspects of disease, no evidence other than those of the bones has survived. But inasmuch as most illnesses do not affect the osseous structure the first conclusive evidence of the prevalence of parasitic diseases of man is disclosed within the period of written history approximately 5500 years ago. But the accounts are vague, exaggerated or untrustworthy and blurred as to the all embracing designation: epidemic or pestilence. In the Book of Genesis, the phenomenon of *epidemic* is established, for it is recorded that Moses and Aaron, when they made their first request to Pharaoh that the Israelites might leave Egypt, expressed the fear that God would send a "pestilence" amongst them if they failed to carry out His commands. The epidemics of "boils and blains" or "plagues" which followed the progress of the Ark of the Covenant are not described with sufficient detail

to permit the historian of epidemics to recognize them. The outburst of infectious diseases described by Thucydides as having raged in and about Athens during the second Peloponnesian War, 430 B.C., is the first epidemic in history to be described in detail. Different medical writers have identified it with plague, typhus, smallpox, influenza, erysipelas and scarlet fever. No final identification has been made. It may have been either a disease unknown to us which has long disappeared, though that is quite unlikely, or a disease which is at the present time rarely epidemic. There is no doubt that certain of the infectious diseases have been much more prominent epidemically than others, namely, plague, influenza, cholera and smallpox. These have been and still are the *Big Four of the infections.*

Again and again attempts have been made and are still being made to read from *transmitted documents* that new infectious diseases originated within historic times. Many authors believe in the recent origin of cholera, epidemic meningitis, undulant fever, sleeping sickness and the sweating s i c k n e s s. The latter appeared as an epidemic in 1485 and was supposed to be a new disease which had its origin in England. From a judicious consideration of its clinical symptoms and epidemiological behavior one must conclude that it was nothing more or less than influenza. Without going into further detail, it may be stated that it is highly doubtful that new diseases have been in progress of development during the times which can be historically surveyed. However, *one fact is fully documented in the historical accounts of the notable epidemics that certain infectious diseases have been smuggled* into regions in which they were previously unknown. The reports are so numerous and the documents embrace so many different diseases such as syphilis, tuberculosis, smallpox, measles, leprosy, diphtheria, infantile paralysis, etc., that the few exceptions which fail to meet a particularly severe critical analysis are of minor significance. In fact, modern epidemiology accepts these misplaced peregrinations of contagious diseases as self-evident phenomena and merely investigates the catastrophic consequences.

It may not be out of place to illustrate this state of affairs with a concrete example. *Parrot fever or psittacosis* attracted little or no attention as a malady of certain occupational groups, the breeders of parrakeets, until the distribution of diseased birds caused epidemic outbreaks in various parts of the United States. Far-flung studies proved the existence of parrot fever in a latent state among the many hundreds and thousands of pet birds raised in captivity during the past five to eight years. Since the breeding stock originated in Australia or South America, it was reasonable to suspect that the source of the infectious disease would be found in the jungles of the two continents. That this assumption was correct was fully proven by the demonstration of the disease agents in the native birds. Brought to the American shores, the intensive breeding operations, encouraged by greed for financial reward, enhanced in various ways the relatively mild character of the infections, and thus created the factors leading to epidemic latency and its disastrous consequences.

These transportations and establishments of the infectious diseases have, aside from practical, also theoretical interest. It is well known that a parasitic disease, prevalent in a certain region, rarely if ever disappears. It persists tenaciously despite sanitary control measures. Consequently, any region, small or large, which is still free from certain diseases, is not an old or extinguished focus. Increased and intensified traffic by water, rail and air, inter- and intra continental travel has greatly narrowed and diminished the number and expanse of the territories exempt from disease. A spread from east to west on the European continent is not surprising if one remembers that the larger part of the population of the world live in Asia under conditions of insanitation and crowding. These and other considerations leave little doubt that the majority of communicable diseases of man originated in certain population groups, and their spread was e n t i r e l y secondary. This so-called "monocentric" concept of the origin of contagious disease offers no answer to the "when" and "where." However, an appreciation of the genesis as outlined should greatly encourage the sadly neglected field of historic-geographic pathology, which may furnish the material to elaborate the ideas here expressed. An example of the problems involved is furnished by the discussions which arise in connection with the origin of syphilis. Despite all of the historical research, it is not possible to state definitely and unequivocally whether or not it was imported to America from the Island of Hispaniola. Until the leading pathologists have agreed upon what constitutes irrefutable evidence of syphilitic disease of the bones, their dicta pro or con must be rejected. A further study of the skeleton remains, both in Europe and the Americas, may help to clarify the contradictory literary evidence. Until then the origin of syphilis must remain undecided.

(Continued in next issue)

MORBIDITY

Complete Reports for Following Diseases for Week Ending June 12, 1937

Chickenpox

947 cases: Alameda County 1, Alameda 14, Albany 4, Berkeley 72, Emeryville 1, Oakland 62, San Leandro 1, Chico 3, Gridley 1, Calaveras County 1, Contra Costa County 7, Pittsburg 1, Fresno County 2, Fresno 3, Glenn County 5, Humboldt County 2, Eureka 3, Westmoreland 2, Kern County 22, Bakersfield 1, Kings County 1, Los Angeles County 34, Alhambra 1, Beverly Hills 14, Burbank 2, Compton 1, Culver City 1, Glendale 3, Hermosa Beach 4, Huntington Park 3, Inglewood 2, Long Beach 23, Los Angeles 129, Pasadena 28, San Gabriel 1, Santa Monica 10, Whittier 7, Hawthorne 6, Maywood 1, Madera 1, Mill Valley 4, Yosemite National Park 1, Nevada City 29, Orange County 6, Anaheim 3, Santa Ana 13, Placentia 3, Placer County 7, Riverside County 2, Corona 2, Riverside 1, Sacramento County 39, Sacramento 38, Ontario 1, San Bernardino 1, San Diego County 9, El Cajon 1, La Mesa 1, National City 5, Oceanside 3, San Diego 49, San Francisco 75, San Joaquin County 3, Stockton 5, San Luis Obispo 2, San Mateo County 16, Daly City 2, San Bruno 1, South San Francisco 4, Santa Barbara County 3, Santa Barbara 4, Santa Maria 2, Santa Clara County 3, Mountain View 3, Palo Alto 1, San Jose 7, Santa Clara 7, Dixon 44, Sonoma County 45, Porterville 11, Tuolumne County 2, Sonora 2, Ventura County 4, Davis 2, Yuba County 1.

Diphtheria

33 cases: Oakland 3, Humboldt County 1, Los Angeles County 4, Los Angeles 2, Sacramento 1, National City 1, San Diego 5, San Francisco 3, Santa Barbara 1, Yolo County 11, Yuba County 1.

German Measles

36 cases: Alameda 1, Berkeley 12, Oakland 1, San Leandro 1, Eureka 1, Los Angeles County 4, Long Beach 2, Los Angeles 2, Pomona 2, Santa Ana 1, Sacramento 1, San Diego County 1, San Francisco 5, San Joaquin County 1, San Jose 1.

Influenza

2126 cases: Brawley 1989, Bakersfield 1, Lassen County 36, Susanville 1, Los Angeles County 12, Glendale 1, Glendora 1, Los Angeles 7, Hawthorne 26, Madera County 1, Nevada City 1, Brea 4, Santa Ana 2, Placer County 5, Auburn 1, San Jacinto 1, San Francisco 1, Tulare County 36.

Malaria

4 cases: Kern County 2, Orange County 1, Yuba County 1.

Measles

400 cases: Berkeley 1, Oakland 8, Fresno County 1, Humboldt County 3, Kern County 1, Kings County 3, Los Angeles County 6, Beverly Hills 1, Burbank 1, Glendale 19, Long Beach 7, Los Angeles 18, King City 1, Orange County 4, Anaheim 2, Newport Beach 1, Seal Beach 1, Placer County 19, Auburn 7, Plumas County 1, Riverside County 13, Corona 43, Riverside 10, Sacramento County 120, Sacramento 29, San Bernardino 2, San Diego County 21, El Cajon 3, National City 3, San Diego 5, San Francisco 23, Lodi 1, Stockton 1, San Luis Obispo County 5, Arroyo Grande 1, Paso Robles 1, San Mateo County 1, Daly City 1, Santa Clara County 1, Redding 1, Sonoma County 1, Yuba City 2, Ventura County 1, Yolo County 1, Winters 2, Marysville 1, California 2.*

Mumps

601 cases: Alameda 1, Berkeley 19, Emeryville 5, Oakland 25, San Leandro 2, Contra Costa County 1, Pittsburg 3, Fresno 9, Humboldt County 2, Eureka 3, Kern County 4, Bakersfield 1, Kings County 7, Los Angeles County 63, Alhambra 5, Arcadia 4, Beverly Hills 6, Claremont 1, Compton 8, El Segundo 2, Huntington Park 1, Inglewood 2, Long Beach 10, Los Angeles 23, Manhattan 8, Monrovia 1, Montebello 1, Pasadena 16, San Gabriel 1, Santa Monica 11, Whittier 1, Lynwood 1, Hawthorne 24, Gardena 1, Madera 4, Mill Valley 19, San Rafael 6, Mono County 1, Monterey County 2, King City 4, Orange County 13, Brea 2, Fullerton 2, Newport Beach 3, Santa Ana 5, Placentia 1, Tustin 1, Riverside County 1, Riverside 6, Sacramento County 5, Sacramento 3, San Bernardino 2, San Diego County 5, National City 5, San Diego 82, San Francisco 84, San Joaquin County 3, Lodi 2, Stockton 4, San Luis Obispo County 1, Paso Robles 1, San Luis Obispo 1, San Mateo County 3, Daly City 13, Santa Barbara County 1, Lompoc 1, Santa Barbara 4, Santa Clara County 1, Mountain View 2, Palo Alto 1, San Jose 9, Dixon 1, Stanislaus County 8, Modesto 4, Tulare County 1, Ventura County 8, Yolo County 1, Marysville 2, California 1.*

Pneumonia (Lobar)

49 cases: Los Angeles County 5, Azusa 1, Glendale 1, Long Beach 1, Los Angeles 15, Pomona 1, South Gate 1, Gardena 1, Madera County 1, Madera 1, Grass Valley 1, Sacramento 4, Redlands 1, San Francisco 9, San Joaquin County 1, San Luis Obispo County 2, San Jose 1, Stanislaus County 1, Newman 1.

Scarlet Fever

192 cases: Alameda County 2, Berkeley 3, Oakland 6, Chico 3, Gridley 1, Martinez 3, Fresno County 2, Fresno 2, Parlier 1, Glenn County 1, Humboldt County 1, Eureka 1, Kern County 9, Bakersfield 1, Susanville 5, Los Angeles County 12, Glendale 1, Long Beach 3, Los Angeles 34, Monrovia 1, Pasadena 1, Redondo 1, Santa Monica 1, Torrance 1, Lynwood 1, South Gate 1, Signal Hill 1, Maywood 1, Bell 1, Napa County 1, Napa 1, Orange County 1, Anaheim 1, Huntington Beach 1, Santa Ana 2, Riverside County 2, Corona 1, Riverside 1, Sacramento County 9, Sacramento 12, Ontario 1, San Diego 3, San Francisco 19, San Joaquin County 6, Stockton 3, San Luis Obispo County 1, San Mateo County 1, Daly City 1, Santa Barbara County 1, Santa Clara County 1, Palo Alto 1, San Jose 5, Santa Clara 1, Dunsmuir 4, Vallejo 1, Stanislaus County 1, Tulare County 5, Ventura County 1, Yolo County 2, California 1.*

Smallpox

8 cases: Pasadena 1, Pomona 1, San Diego 5, Siskiyou County 1.

Typhoid Fever

4 cases: Kern County 1, Riverside County 1, San Diego County 1, California 1.*

Whooping Cough

625 cases: Alameda County 6, Berkeley 8, Oakland 10, Gridley 6, Pittsburg 1, Fresno County 21, Fresno 3, Selma 3, Glenn County 3, Imperial County 5, Kern County 12, Kings County 4, Lassen County 79, Los Angeles County 37, Alhambra 2, Beverly Hills 1, Burbank 1, Claremont 1, Compton 1, Culver City 2, El Segundo 1, Glendale 5, Huntington Park 1, Inglewood 2, Long Beach 10, Los Angeles 82, Monrovia 1, Pasadena 15, Pomona 8, San Fernando 3, Santa Monica 2, Torrance 3, Lynwood 1, Hawthorne 4, Monterey Park 1, Gardena 7, Madera 1, Mill Valley 2, Yosemite National Park 1, Mendocino County 6, Monterey County 1, Orange County 8, Anaheim 1, Brea 1, Fullerton 1, Santa Ana 3, Laguna Beach 2, Placer County 5, Riverside County 12, Corona 2, Riverside 16, San Jacinto 1, Sacramento County 8, Sacramento 2, Ontario 1, San Bernardino 9, San Diego County 2, San Diego 5, San Francisco 48, San Joaquin County 34, Lodi 8, Stockton 8, San Luis Obispo County 2, San Mateo County 3, Daly City 1, San Carlos 3, Menlo Park 1, Santa Barbara County 14, Santa Maria 4, Santa Clara County 2, San Jose 6, Watsonville 1, Sonoma County 4, Stanislaus County 4, Ceres 2, Modesto 3, Tulare County 5, Tuolumne County 1, Ventura County 13, Ventura 3, Yolo County 4, Woodland 6, California 3.*

Meningitis (Epidemic)

3 cases: Long Beach 1, Lynwood 1 ,Yuba City 1.

Dysentery (Amoebic)

2 cases: Los Angeles County 1, Dixon 1.

Dysentery (Bacillary)

13 cases: Los Angeles County 2, Inglewood 1, Los Angeles 9, Orange 1.

Pellagra

One case: San Francisco.

Poliomyelitis

4 cases: Los Angeles County 1, Los Angeles 1, National City 1, Tulare County 1.

Tetanus

3 cases: Los Angeles.

Trachoma

4 cases: Fresno 1, Riverside County 3.

Paratyphoid Fever

One case: Santa Clara County.

Rocky Mountain Spotted Fever

One case: Modoc County.

Trichinosis

One case: Albany.

Jaundice (Epidemic)

2 cases: El Dorado County.

Food Poisoning

17 cases: Fresno County 5, Madera County 4, San Francisco 2, San Luis Obispo County 3, Santa Cruz County 3.

Undulant Fever

4 cases: Los Angeles County 1, Salinas 1, San Bernardino 1, Porterville 1.

Coccidioidal Granuloma

2 cases: Kern County 1, Los Angeles 1.

Septic Sore Throat

2 cases: Albany 1, San Luis Obispo County 1.

Rabies (Animal)

45 cases: Fresno County 2, Los Angeles County 11, Burbank 1, Culver City 1, El Monte 1, Long Beach 1, Los Angeles 15, Manhattan 1, Montebello 1, Pomona 1, Santa Monica 1, Whittier 1, South Gate 5, Bell 1, Santa Cruz County 1, Oakdale 1.

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* Cases charged to "California" represent patients ill before entering the State or those who contracted their illness traveling about the State throughout the incubation period of the disease. These cases are not chargeable to any one locality.

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